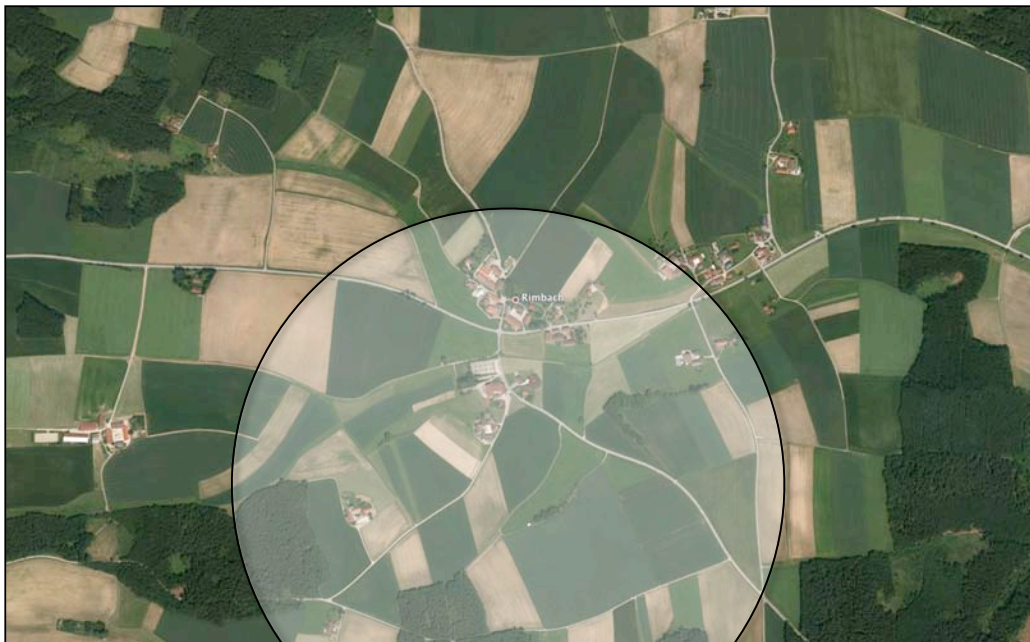


# Alterations in Hormone Physiology



## Rimbach, Bavaria (2004 - 2005)



In spring of 2004 a GSM cell tower was installed near Rimbach, Bavaria (population ~ 2000).

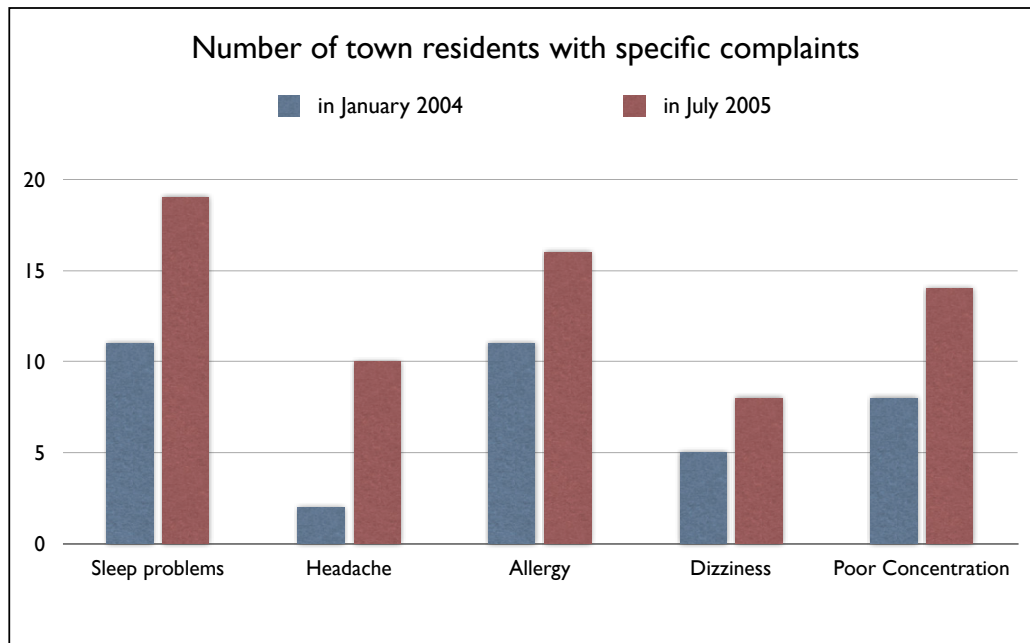
Prior to activation of the antenna, the town residents were asked to participate in a mass screening.

Urine levels of the stress hormones adrenaline, noradrenaline, dopamine, and phenylethylamine were measured in January/February 2004, and again in July 2004, January 2005, and July 2005.

A medical history and symptom questionnaire was also administered.

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## Rimbach, Bavaria (2004 - 2005)

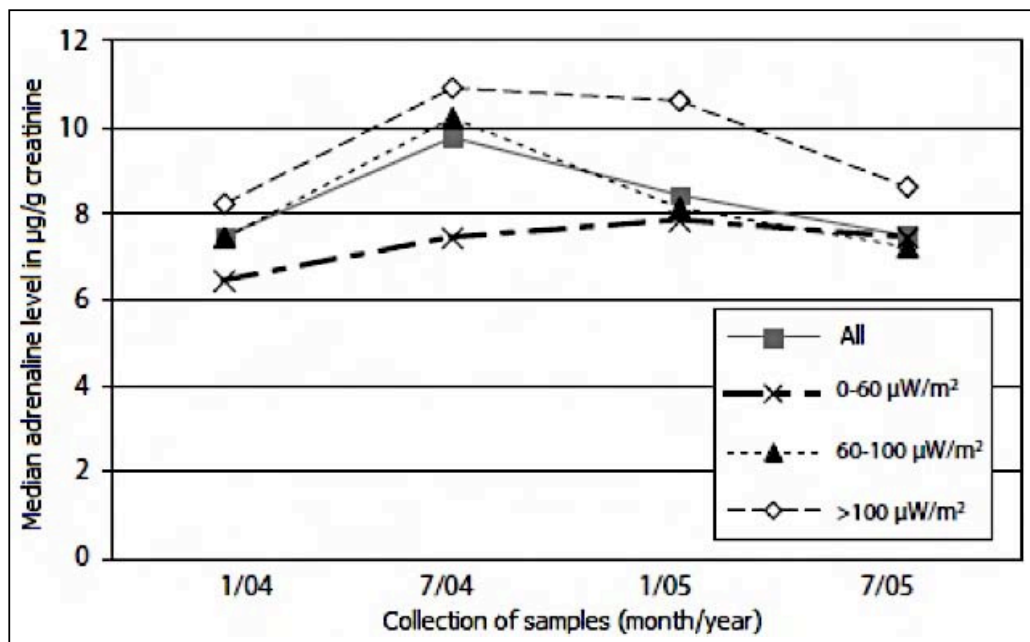


Here we see some symptom scores before tower activation (blue) and after a year of tower transmission (red)  
Some health complaints increased over the course of the study.

Buchner K EH. Changes of Clinically Important Neurotransmitters under the Influence of Modulated RF Fields--A Long-term Study under Real-life Conditions. *Umwelt-Medizin-Gesellschaft* (2011); 24(1):44-57.

Abstract: This follow-up of 60 participants over one and a half years shows a significant effect on the adrenergic system after the installation of a new cell phone base station in the village of Rimbach (Bavaria). After the activation of the GSM base station, the levels of the stress hormones adrenaline and noradrenaline increased significantly during the first six months; the levels of the precursor dopamine decreased substantially. The initial levels were not restored even after one and a half years. As an indicator of the dysregulated chronic imbalance of the stress system, the phenylethylamine (PEA) levels dropped significantly until the end of the study period. The effects showed a dose-response relationship and occurred well below current limits for technical RF radiation exposures. Chronic dysregulation of the catecholamine system has great relevance for health and is well known to damage human health in the long run.

## Adrenaline levels



Results were stratified by in-home exposure levels ( $\text{mW}/\text{m}^2$ ) in three cohorts.

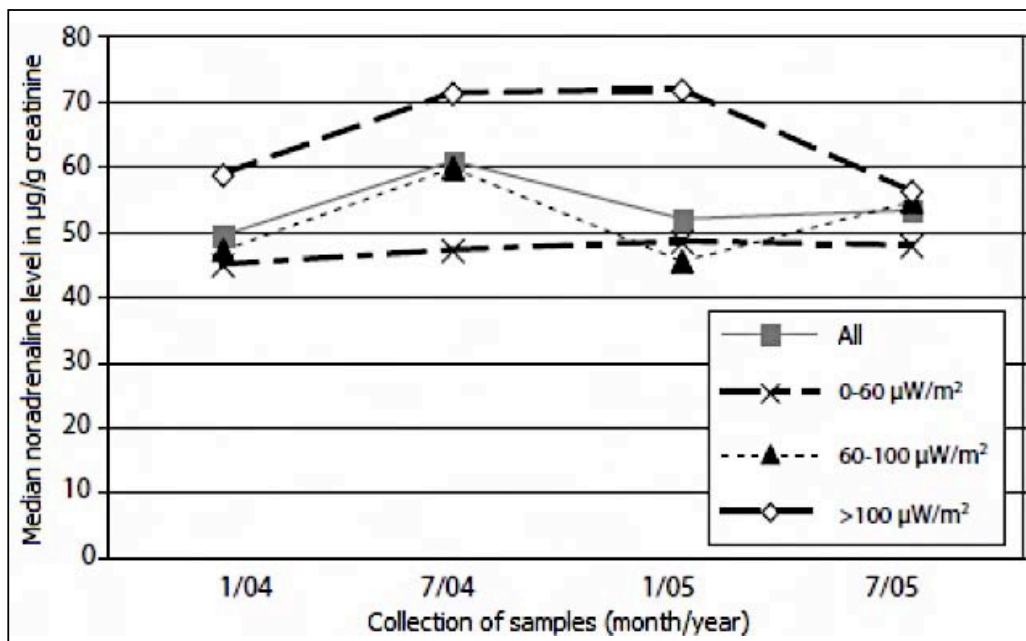
Hormone levels graphed for each exposure cohort.

Levels of the stress hormone adrenaline rose after the transmitter became active.

In the highest exposure cohort adrenaline levels never returned to pre-exposure baseline.

Fig. 3: Median adrenaline levels for all participating citizens of Rimbach whose cell phone base station exposure was above  $100 \mu\text{W}/\text{m}^2$ , between  $60$  and  $100 \mu\text{W}/\text{m}^2$ , or up to  $60 \mu\text{W}/\text{m}^2$ . The power density levels refer to peak values of the GSM radiation exposure in front of a given residence.

## Noradrenaline levels



Noradrenaline levels also rose after the transmitter became active.

They never returned to pre-exposure baseline.

Fig. 7: Median noradrenaline levels in all participating citizens of Rimbach as a function of GSM power density levels (peak values)

## Effect of cordless DECT phones.

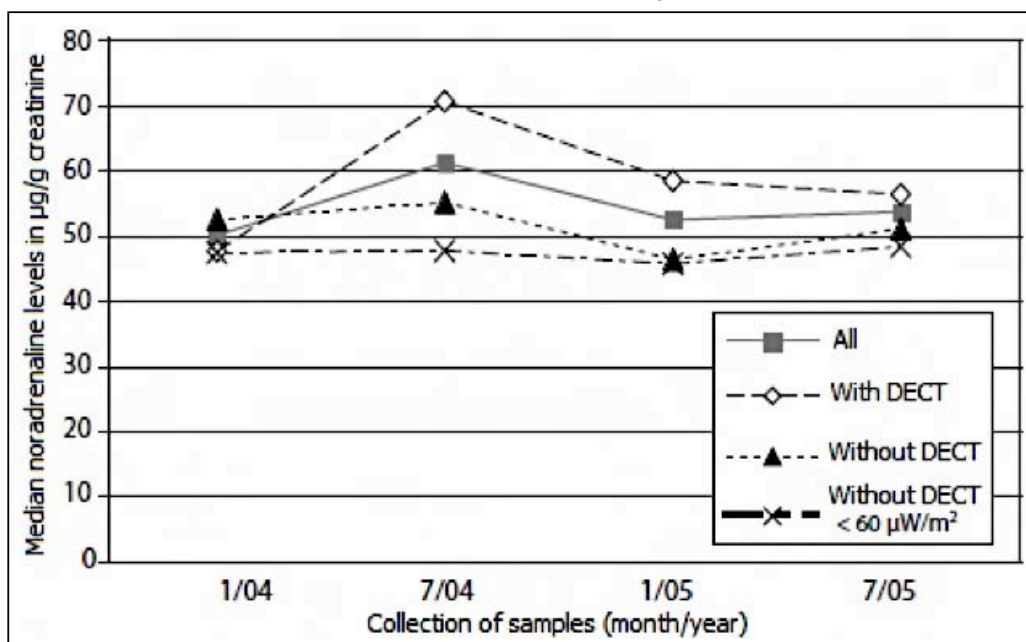
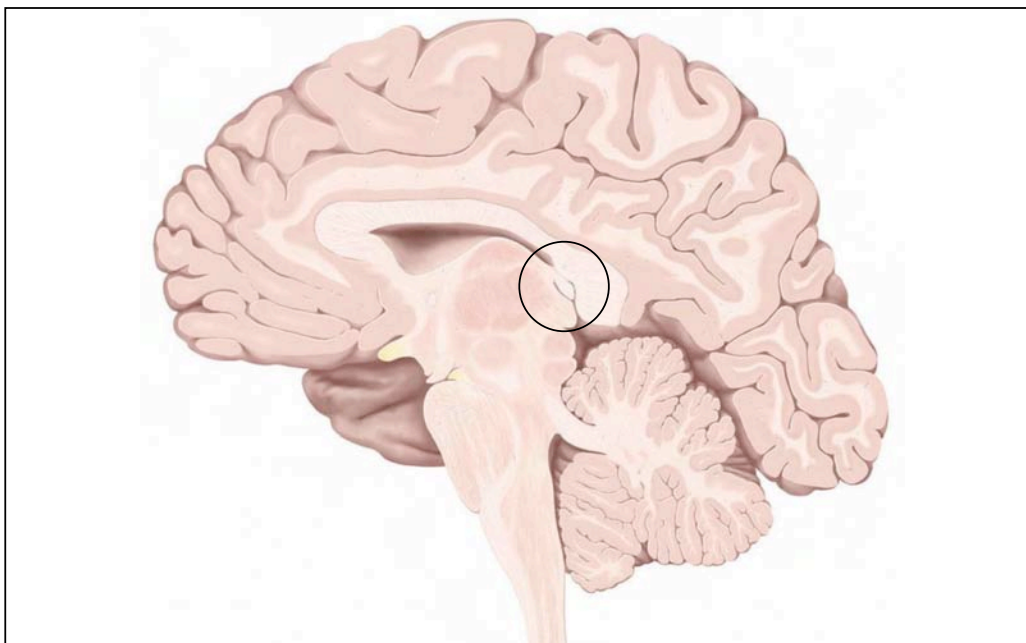


Fig. 8: Median noradrenaline values for subjects who had a DECT phone or other wireless devices at home, for those without indoor wireless devices, as well as for subjects without indoor wireless devices and with a GSM radiation exposure up to 60  $\mu\text{W}/\text{m}^2$  (peak value measured in front of residence)

Buchner K EH. Changes of Clinically Important Neurotransmitters under the Influence of Modulated RF Fields--A Long-term Study under Real-life Conditions. Umwelt-Medizin-Gesellschaft (2011); 24(1):44-57.

Abstract: This follow-up of 60 participants over one and a half years shows a significant effect on the adrenergic system after the installation of a new cell phone base station in the village of Rimbach (Bavaria). After the activation of the GSM base station, the levels of the stress hormones adrenaline and noradrenaline increased significantly during the first six months; the levels of the precursor dopamine decreased substantially. The initial levels were not restored even after one and a half years. As an indicator of the dysregulated chronic imbalance of the stress system, the phenylethylamine (PEA) levels dropped significantly until the end of the study period. The effects showed a dose-response relationship and occurred well below current limits for technical RF radiation exposures. Chronic dysregulation of the catecholamine system has great relevance for health and is well known to damage human health in the long run.

## Melatonin

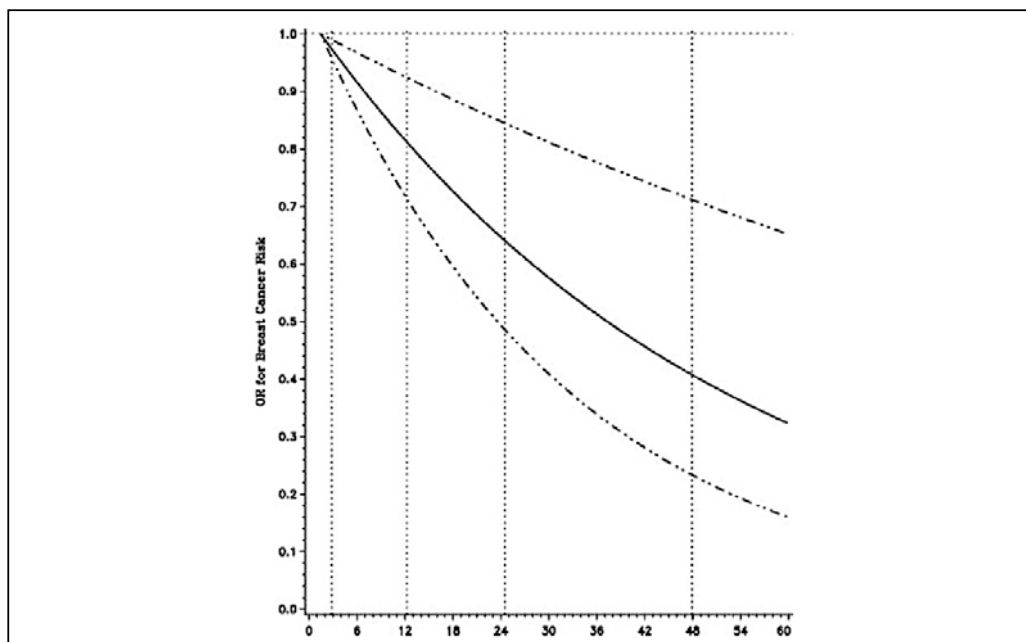


The pineal gland secretes melatonin. Ambient light suppresses melatonin secretion. So melatonin secretion is high during the night-time hours, peaking shortly after midnight. **Higher melatonin levels are part of what makes us feel “sleepy” at night.**

**Exposure to light during the night-time hours will lead to a rapid suppression of melatonin secretion by the pineal gland,** and this can cause disruption of sleep and derangement of the circadian rhythm.

Melatonin is one of the most potent anti-oxidant molecules in the human body, and acts to reduce reactive oxidative processes in the body. Melatonin can quench the damaging free radical activity produced by inflammation. The presence of elevated melatonin at night is therefore a key factor in the healing and rejuvenating functions that we associate with “a good night’s sleep”.

## Melatonin lowers risk of breast cancer.



[Figure 1. Smoothing spline plot for aMT6s level (ng/mg creatinine) in relation to breast cancer risk among postmenopausal women. 95% CIs are indicated by dotted lines.]

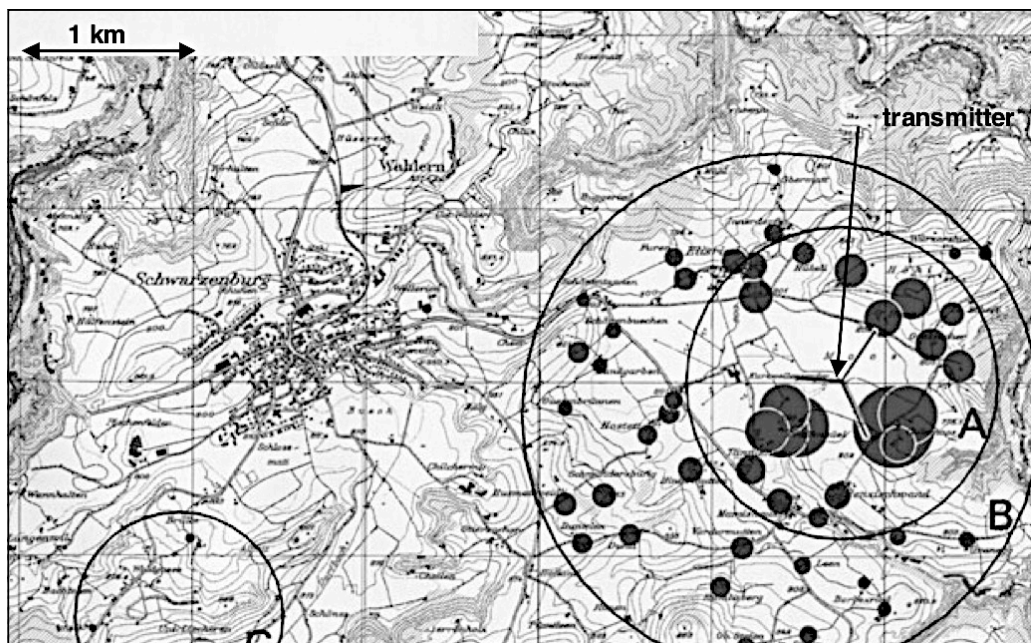
Melatonin is also protective against the growth of cancer cells, and disruption of the circadian melatonin cycle has been shown to lead to increased tumor growth in a variety of cancer types.

**Women who have lower levels of nocturnal melatonin are at greater risk for developing breast cancer.**

In 2007 the International Agency for Research on Cancer declared night shift work to be a probable carcinogen due to increased breast cancer risk..



## Schwarzenburg Short Wave Radio Broadcast Tower – 1998



RF exposure can also lower melatonin levels.

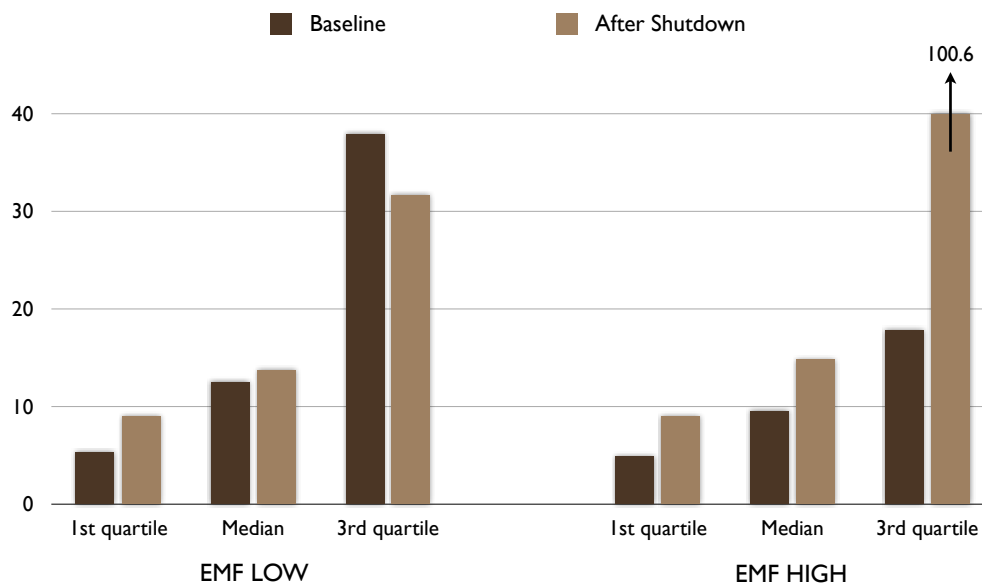
Schwarzenburg experiment: Decommissioning the Swiss national short-wave radio transmitter of Schwarzenburg, about 20 km south of the Swiss Capital city of Berne, transmitting since 1939. It operated at frequencies of 3 to 30 MHz, with a maximum power of two times 150 kW.

Figure 1. Map of the Schwarzenburg area showing the location of the transmitter, the H-field measurement points and the location of the zones A, B, C and R. The diameters of the circles around the measurement points indicate the 24 hour average magnetic field strengths, as measured between August 1992 and August 1993. (Reproduced with approval from swisstopo (BA046633.))

Abelin T, Altpeter E, Roosli M. Sleep Disturbances in the Vicinity of the Short-Wave Broadcast Transmitter Schwarzenburg. *Somnologie* (2005); 9:203-209.

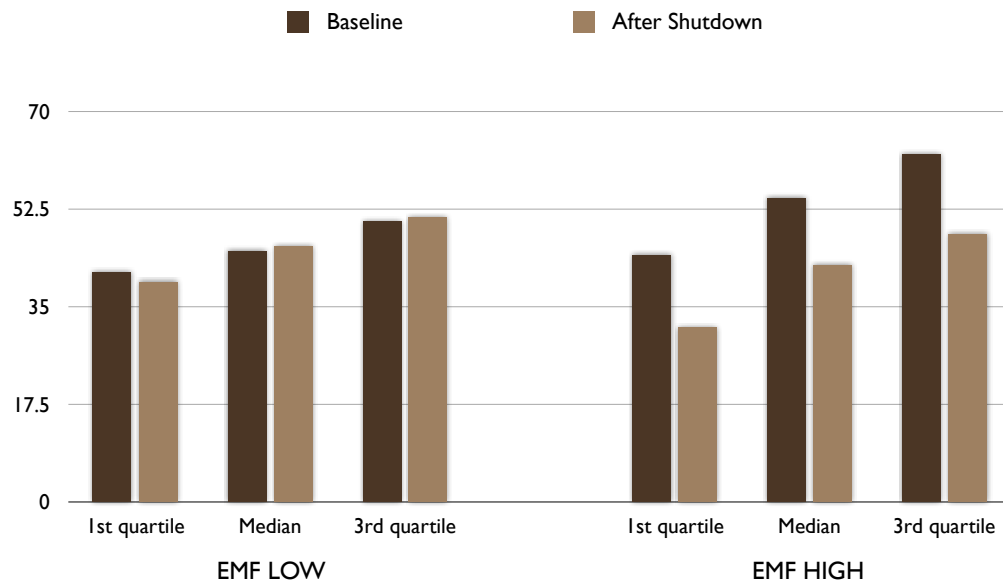
Altpeter ES, Roosli M, Battaglia M, Pfluger D, Minder CE, Abelin T. Effect of short-wave (6-22 MHz) magnetic fields on sleep quality and melatonin cycle in humans: the Schwarzenburg shut-down study. *Bioelectromagnetics* (2006); 27(2):142-150.

## Melatonin Excretion (pg/ml)



Altpeter ES, Roosli M, Battaglia M, Pfluger D, Minder CE, Abelin T. Effect of short-wave (6-22 MHz) magnetic fields on sleep quality and melatonin cycle in humans: the Schwarzenburg shut-down study. *Bioelectromagnetics* (2006); 27(2):142-150.

## Morning Fatigue (0 - 100 Scale)



Altpeter ES, Roosli M, Battaglia M, Pfluger D, Minder CE, Abelin T. Effect of short-wave (6-22 MHz) magnetic fields on sleep quality and melatonin cycle in humans: the Schwarzenburg shut-down study. *Bioelectromagnetics* (2006); 27(2):142-150.